Express5800/320Ma:
Software Availability Manager
User's Guide

NEC Solutions (America), Inc.
NR007W

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Contents

Preface vii

1. Overview of the Software Availability Manager 1-1
- Software Availability Manager 1-1
  - Software Availability Manager Functions 1-2
  - Monitoring Instances and Events 1-2
  - SAM Instances 1-3
  - Using Email and Executing Programs 1-4
- Event Log Messages from SAM 1-4

2. SAM Settings Reference 2-1
- Express5800/320Ma Monitored Instances Tab 2-1
- Instance Parameters 2-2
- Alert Thresholds 2-5
  - Warnings and Alarms 2-5
  - Threshold Units 2-6
- How SAM Scans an Instance 2-7

3. Configuring the Software Availability Manager 3-1
- Configuring Email 3-1
  - Email User Setup 3-2
  - Email Alert Setup 3-3
    - Alert Email Notification 3-3
    - Default Email Alert Notification 3-3
    - Nondefault Alert Notification 3-4
    - Associating a Nondefault Alert ID with an Instance 3-5
    - Deleting an Alert ID 3-6
    - Sending No Notification 3-7
    - Testing Email 3-7
- Setting Up SAM to Run a Program 3-8
- Changing Default Values of the Instance Parameters 3-8

SAM Instances 3-9
Context Switches (Per Second) 3-9
CPU Usage 3-10
Disk Free Space 3-10
Event Log Messages 3-11
Memory Available 3-11
Page File Usage 3-11

4. Sample Configuration 4-1
Sample Configuration 4-1
Displaying the SAM Interface 4-2
Configuring Context Switches (Per Second) 4-2
Configuring CPU Usage 4-3
Configuring Disk Free Space 4-4
Configuring Event Log Messages 4-5
Configuring Memory Available 4-6
Configure Page File Usage 4-7
Making Changes Effective 4-8

Glossary Glossary-1

Index Index-1

Figures

Figure 2-1.	Enabling Alerts	2-2
Figure 2-2.	Scan Poll Rate, Email Alert ID, and Program to Launch	2-2
Figure 2-3.	Scan-Related Parameters	2-3
Figure 2-4.	Threshold Setup	2-6
Figure 2-5.	Scanning Diagram, Part 1	2-8
Figure 2-6.	Scanning Diagram, Part 2	2-9
Figure 3-1.	Sample Default Email Alert	3-4
Figure 3-2.	Accepting Changes to the Configuration	3-6
Figure 3-3.	Email Configuration Error	3-7
Figure 4-1.	Changing Units of Measurement	4-5
Figure 4-2.	Accepting Changes to the Configuration	4-8

Tables

Table 4-1. SAM Parameters 4-1

Preface

Purpose of This Manual

The *Express5800/320Ma: Software Availability Manager* explains how to configure and use ftServer Software Availability Manager, an application that monitors the performance of critical Express5800/320Ma system components and the status of user applications.

Audience

This manual is intended for personnel who administer or monitor Express5800/320Ma systems.

Notation Conventions

This document uses the notation conventions described in this section.

Warnings, Cautions, and Notes

Warnings, cautions, and notes provide special information and have the following meanings:

WARNING

A warning indicates a situation where failure to take or avoid a specified action could cause bodily harm or loss of life.

CAUTION

A caution indicates a situation where failure to take or avoid a specified action could damage a hardware device, program, system, or data.

NOTE

A note provides important information about the operation of an Express5800/320Ma system.

Typographical Conventions

The following typographical conventions are used in Express5800/320Ma documents:

- The bold font emphasizes words in text or indicates text that you type, the name of a screen object, or the name of a programming element. For example:

  Before handling or replacing the clock card, make sure that you are properly grounded by using a grounded wrist strap.

  In the **System Properties** dialog box, click the **Hardware** tab.

  Call the **RegisterDeviceNotification** function.

- The italic font introduces new terms and indicates programming and command-line arguments that the user defines. For example:

  Many hardware components are *customer-replaceable units* (CRUs), which can be replaced on-site by system administrators with minimal training or tools.

  copy *filename1 filename2*

  Pass a pointer for the *NotificationFilter* parameter

- The monospace font indicates sample program code and output, including message text. For example:

  ```
  #include <iostream.h>
  ```

  ```
  The operation completed successfully.
  ```

Getting Help

If you have a technical question about Express5800/320Ma hardware or software, try these online resources first:

- **Online support from NEC Technical Support.** You can find the latest technical information about an Express5800/320Ma through online product support at the NEC Technical Support Web site:

  http://support.necsam.com/servers/

- **Online product support for Microsoft® products**. Your primary source for support is the computer manufacturer who provided your software, or an authorized Microsoft Support Provider. You can also find the latest technical information about Microsoft Windows® and other Microsoft products through online product support at the Microsoft Help and Support Web site:

  http://support.microsoft.com/

If you are unable to resolve your questions with the help available at these online sites, and the Express5800/320Ma system is covered by a service agreement, please contact NEC Technical Support (866-269-1239).

Notices

- All regulatory notices are provided in the site planning guide for your system.
- Although this guide documents modem functionality, modems are not available for all systems. Ask your sales representative about modem availability.
- ActiveService Network (ASN) is not currently available but may be ordered in the future.

Chapter 1
Overview of the Software Availability Manager

The ftServer Software Availability Manager (SAM) Service monitors system performance and user-application availability. This chapter presents an overview of the SAM service. It includes the following topics:

- "Software Availability Manager"
- "Event Log Messages from SAM"
- "Event Log Messages from SAM"

Software Availability Manager

The Software Availability Manager consists of a Windows service that runs at system startup and a snap-in that runs within a Microsoft Management Console (MMC). The SAM Service monitors the performance of critical Express5800/320Ma system components and the status of user applications.

You can configure the SAM snap-in to send email or execute a program based on the status of applications, configured performance thresholds, or messages sent to the Event Log.

SAM is one of two NEC-supplied MMC snap-ins. The other is the ftServer Management Console (ftSMC) snap-in, which is documented in the system administrator's guide.

SAM and ftSMC both monitor system functionality. Most of the elements (called *instances*) that SAM monitors relate to system performance, though it also detects user-application failures and monitors Event Log entries for warning and error messages. On the other hand, ftSMC monitorssystem hardware and the device drivers for the ftServer system.

SAM and ftSMC both report system information to system administrators.

Software Availability Manager Functions

SAM has the following functions:

- Monitor user applications to detect when they fail.
- Monitor the performance of critical system components—such as disk, CPU, and memory—to detect performance problems before they cause a crash or data loss.
- Send messages to the Windows Event Log and notify users, by email, of certain system-performance conditions.
- Execute user-specified programs in response to configured alert conditions.

Monitoring Instances and Events

SAM monitors *instances* and *events*.

Instances are the system performance elements that you specify to be monitored; for instance, CPU usage, disk free space, and so on. The list of instances you can monitor appears on the Express5800/320Ma Monitored Instances tab of the SAM snap-in. (See "SAM Instances" on page 1-3 for a complete list of instances that you can monitor). You specify which instances to monitor by configuring SAM in the MMC console.

An *event*, in the context of SAM, is a state change in a monitored instance. For example, available disk space falling below specified limits is an event. You can configure the instances to generate a warning or alarm and trigger the execution of a program when the instance reaches a certain value.

For example, you can configure SAM to:

- Send an email warning (less severe) or alarm (more severe) to members of a defined email list when available disk space on the system falls to a specified percentage.
- Send email notification to members of a defined email list when the available system memory falls below a specified amount.
- Execute a program when some specified threshold value is reached.

SAM Instances

You can monitor and configure the following instances:

- Context Switches (Per Second). The number of switches per second from one thread to another. A context switch occurs when the processor stops processing one thread and starts processing another. Context switches per second is a measure of how the microkernel is distributing the CPU processing of threads and processes on the system.
- CPU Usage. The percentage of time that the processor is busy executing a non-idle thread. CPU usage measures how much work the CPU is doing and which processes are using the CPU's time. Sustained high CPU usage can degrade system performance.
- Disk Free Space. The ratio of the free disk space to total usable space, per each logical disk on a system. The threshold values supplied for this instance apply to each logical disk in the system. If any logical disk's free space falls below the configured threshold, for instance, 5%, SAM would send email notification (assuming you configured the instance to do so).
- Event Log:
  - Application Error Messages
  - Application Warning Messages
  - System Error Messages
  - System Warning Messages

  The Event Log instances detect when the Event Log receives a System or Application error or warning message.
- Memory Available. The size in megabytes (MB) of the virtual memory currently available in the system. This quantity combines the size of RAM memory plus the size of the system page file. Running out of virtual memory can cause system instability or even application failures.
- Page File Usage. The amount of page file currently in use. This can help determine whether the page file is too small for your system.

Using Email and Executing Programs

To send email notification, or to have specified programs run automatically when certain threshold values are reached, you must first configure the SAM email facility. See “Configuring Email” on page 3-1 for instructions on how to configure the SAM email facility.

Event Log Messages from SAM

Like any Windows service, SAM sends the following kinds of messages to the Event Log:

- Informational messages, such as service started and service stopped.
- Warning messages. These are reports of the email alerts that SAM sent in response to configured threshold specifications.
- Error messages. These are SAM-based errors, such as invalid configurations, or email failures caused by invalid addresses, and so on.

Chapter 2
SAM Settings Reference

This chapter summarizes the settings of the Software Availability Manager configurable instances and explains the warning and alarm thresholds. It presents the following topics:

- "Express5800/320Ma Monitored Instances Tab"
- "Instance Parameters"
- "Alert Thresholds"
- "How SAM Scans an Instance"

Express5800/320Ma Monitored Instances Tab

You view and configure the SAM instances and their threshold values on the Express5800/320Ma Monitored Instances tab.

To display the Express5800/320Ma Monitored Instances tab

1. On the Express5800/320Ma desktop, click the **ftServer version Management Tools** icon.
2. Right-click the **ftServer Software Availability Manager** icon, then click **Properties**.

There are two nonstandard buttons on the **Express5800/320Ma Monitored Instances** tab:

- **Reset All** restores all instances to their default settings.
- **Use Default** reselects the default email alert for the selected instance.

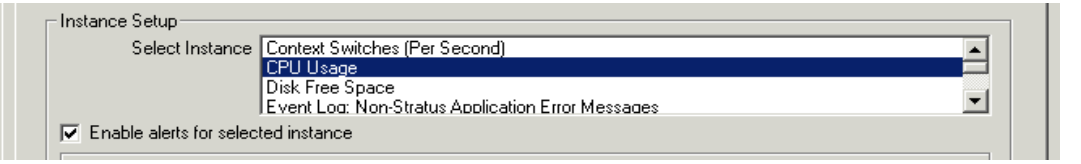
Instance Parameters

Instances are the system performance elements that the Express5800/320Ma SAM monitors; for example, CPU usage, free disk space, and so on. A description of the instances and related settings follows.

The **Enable alerts for selected instance** setting enables warnings and alarms to be generated when the monitored component highlighted in the **Select Instance** menu exceeds its thresholds.

Figure 2-1 shows alerts enabled for the CPU Usage instance.

Figure 2-1. Enabling Alerts



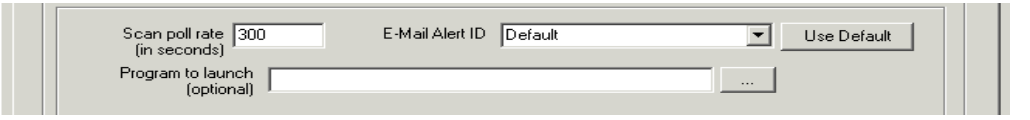
NOTE

The **Enable alerts for selected instance** check box must be selected to enable alert notification for the selected instance.

If you enable alerts for an instance, you must select at least one threshold value.

Figure 2-2 shows the Scan Poll Rate, Email Alert ID, and Program Launch fields.

Figure 2-2. Scan Poll Rate, Email Alert ID, and Program to Launch



Scan Poll Rate (in seconds). The interval, in seconds, at which SAM will scan (poll) an instance to detect a possible *threshold violation*. If this rate is 300, for example, SAM scans the instance's value once every 300 seconds, until detecting a threshold violation.

However, whether a threshold violation actually occurs also depends on whether **Scan retry** is enabled or disabled.

If an instance's value exceeds its threshold:

- and **Scan retry** is disabled, a threshold violation has occurred. In this case, SAM does whatever it has been configured to do in the event of a threshold violation. For instance, it might send email notification or run a program.
- and **Scan retry** is enabled, there is not yet a threshold violation, and SAM continues to scan at the **Scan retry poll rate (in seconds)**.

NOTE

See "How SAM Scans an Instance" on page 2-7 for more information about the scan-related parameters.

The maximum value for this parameter varies per instance.

Email Alert ID. A user-defined string that identifies the alert to be sent. This box must contain either the value "Default," if the associated instance will send the default alert, or an identifier you created in the Email Alert Setup tab.

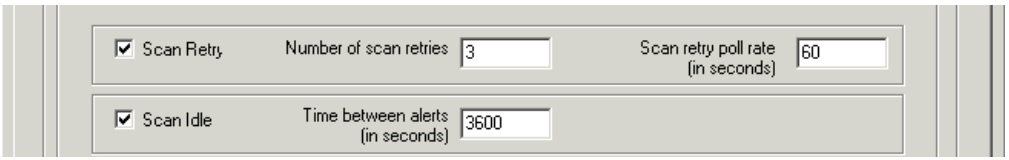
Creating a nondefault alert ID and associating it with an instance is described in "Nondefault Alert Notification" on page 3-4.

The string may be of any length. "Default" is the default setting.

Program to launch (optional). The full path name of the program you want to launch (execute) in the event of a threshold violation. The program that runs must not be interactive, as no window is displayed. Also, the program must exit by itself. This box is left blank by default.

Figure 2-3 shows some of the parameters related to scanning. See "How SAM Scans an Instance" on page 2-7 for an explanation of how SAM uses the scanning parameters.

Figure 2-3. Scan-Related Parameters



Scan retry. A checkbox that enables you to use **Number of scan retries** and **Scan retry poll rate (in seconds)**, which work in tandem.

You must check Scan retry to be able to specify a value for Number of scan retries and Scan retry poll rate.

Number of scan retries. The number of times to retry the scan at the Scan retry poll rate interval.

When Number of scan retries is enabled, if an instance's monitored value exceeds its threshold, SAM continues to scan the instance at the Scan poll rate. If the Number of scan retries value is reached and the instance's value still exceeds its threshold, a threshold violation occurs. SAM will then generate an alert.

If you disable Number of scan retries (by disabling Scan retry), the first detected threshold violation will generate an alert.

The range of values for this parameter varies per instance.

Scan retry poll rate (in seconds). The interval at which SAM makes subsequent scans after detecting a first threshold violation. The subsequent scans are made to verify that the threshold violation is not temporary (a spike).

You must enable Scan retry in order to use Scan retry poll rate.

The maximum value for this parameter varies per instance.

Scan idle. A check box that enables you to use **Time between alerts (in seconds)**.

You must enable Scan idle to be able to specify a value for Time between alerts.

Time between alerts (in seconds). The number of seconds during which an instance is not scanned after an alert has occurred. The Time between alerts is an idle period for scanning.

Enabling this parameter prevents multiple alerts from being issued during the specified period. This minimizes the number of alerts triggered by an instance that remains outside of the normal range.

You must enable Scan idle in order to use Time between alerts.

The maximum value for this parameter is 72 hours (259200 seconds). A more typical value is 3600 (1 hour).

Alert Thresholds

SAM monitors instances by scanning, or polling, the current values of each instance. Each instance is configured with default alert-threshold values expressed in an appropriate unit of measure. When an instance exceeds its threshold, it enters one of two possible conditions: warning or alarm.

NOTE

You can change any of the defaults to values more suitable to your environment. See "Changing Default Values of the Instance Parameters" on page 3-8 for more information.

Warnings and Alarms

Alarms are more urgent than warnings. The thresholds that trigger warnings and alarms can be either high or low, depending on the instance being monitored. For instance, you should configure both low disk space, on the one hand, and a too-high rate of CPU usage, on the other, to generate alarms.

Figure 2-4 shows the threshold settings (as well as the Units parameters) on the Express5800/320Ma Monitored Instances tab. The figure shows High Threshold Warning and High Threshold Alarm as they might be set for the CPU Usage instance. A CPU Usage level of 80% causes a High Threshold Warning; a 90% usage level causes a High Threshold alarm.

The Disk Free Space instance uses low thresholds. You might have the system generate a warning when it detects a Disk Free Space value of 20%, and an alarm when it detects only 10%.

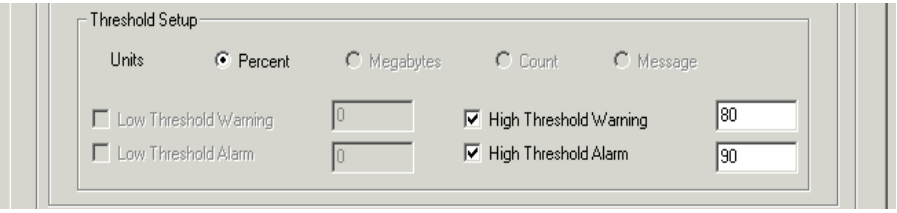
The threshold values are:

- **Low Threshold Warning**. The threshold is a low value, causing a warning alert notification. The next lower threshold causes an alarm.
- **High Threshold Warning**. The threshold is a high value, causing a warning alert notification.The next higher threshold causes an alarm.
- **Low Threshold Alarm**. The threshold is a low value, causing an alarm.
- **High Threshold Alarm**. The threshold is a high value, causing an alarm.

Except for the System Event Log, which has no thresholds, you configure instances with either a low or high condition, as appropriate. Also, you have the option of defining only one condition, for example, Low Threshold Alarm, without defining a Low Threshold Warning.

(An instance can also theoretically be configured with both high and low thresholds, each with warning and alarm conditions, totaling four settings, though there is currently no instance that needs this.)

Figure 2-4. Threshold Setup



Threshold Units

Each instance includes a **Units** item (shown in Figure 2-4) among its parameters. The system automatically sets this parameter.

The Units parameter determines the unit of measure being scanned and interpreted as high or low. Unit values are:

- **Percent,** a value, from 1 to 100, of a component's capacity.
- **Megabytes**, units of 1,048,576 bytes.
- **Count**, for discrete quantity, like the number of context switches per second.
- **Message**, for those instances whose only action is to receive messages, like Application Fault Monitor.

For example, the CPU Usage instance's Units parameter is defined as Percent. Therefore, a High Threshold Alarm value of 90 means that SAM will produce an alarm when the CPU is operating at 90% of capacity. On the other hand, the Memory Available instance's Units parameter is set to Megabytes. Therefore, a Low Threshold Alarm value of 4 means that the system will produce a Low Threshold Alarm alert when only 4 MB of memory are available.

How SAM Scans an Instance

SAM scans the instance at the Scan poll rate (for example, every 30 seconds). If it finds a threshold violation, it checks Scan retry and Number of scan retries.

If Scan retry and (therefore) Number of scan retries are disabled, SAM issues an alert. (Therefore, if you disable Number of scan retries, a single threshold violation generates an alert condition.)

If SAM finds a threshold violation and Scan retry and Number of scan retries are enabled, SAM starts rescanning the instance:

- For the number of times specified by the Number of scan retries value.
- At the interval specified by Scan retry poll rate values.

Number of scan retries specifies how many times SAM will rescan the instance. Scan retry poll rate specifies the interval, in seconds, at which SAM rescans after detecting the first threshold violation. Subsequent scans are used to verify that the threshold violation was not temporary (a spike).

For example, given a Number of scan retries value of 3, if SAM detects 3 more threshold violations (after the first one it detected), the violation was not temporary, and SAM generates an alert.

If, on the other hand, SAM detects fewer than 3 more violations, the threshold violation was temporary. In other words, whenever a rescan detects that a parameter has returned to within its normal range of values, SAM interprets the violation as temporary and returns to scanning according to Scan poll rate (in seconds).

After SAM generates an alert, it then checks whether the Time between alerts parameter is enabled. If it is, SAM resumes scans at the Scan poll rate but will not generate another alert until the Time between alerts expires. If Time between alerts is not enabled, SAM resumes scans at the Scan poll rate and will continue to generate an alert based on the retry and re-alert sequence described above.

There are two additional conditions that apply to the preceding sequences. First, if SAM detects a more-severe threshold violation (that is, a change from a Warning to an Alarm), it restarts scanning the instance at the Scan poll rate, as described at the beginning of this section. Second, if the alert condition returns to a normal value (that is, within all thresholds), SAM sends the Return to Normal message; either the default message or the one you configured in the Return to Normal Message Body. (See “Email Alert Setup” on page 3-3 for information about setting up the Return to Normal message.)

Figure 2-5 and Figure 2-6 diagram the flow of SAM instance scanning.

Figure 2-5. Scanning Diagram, Part 1

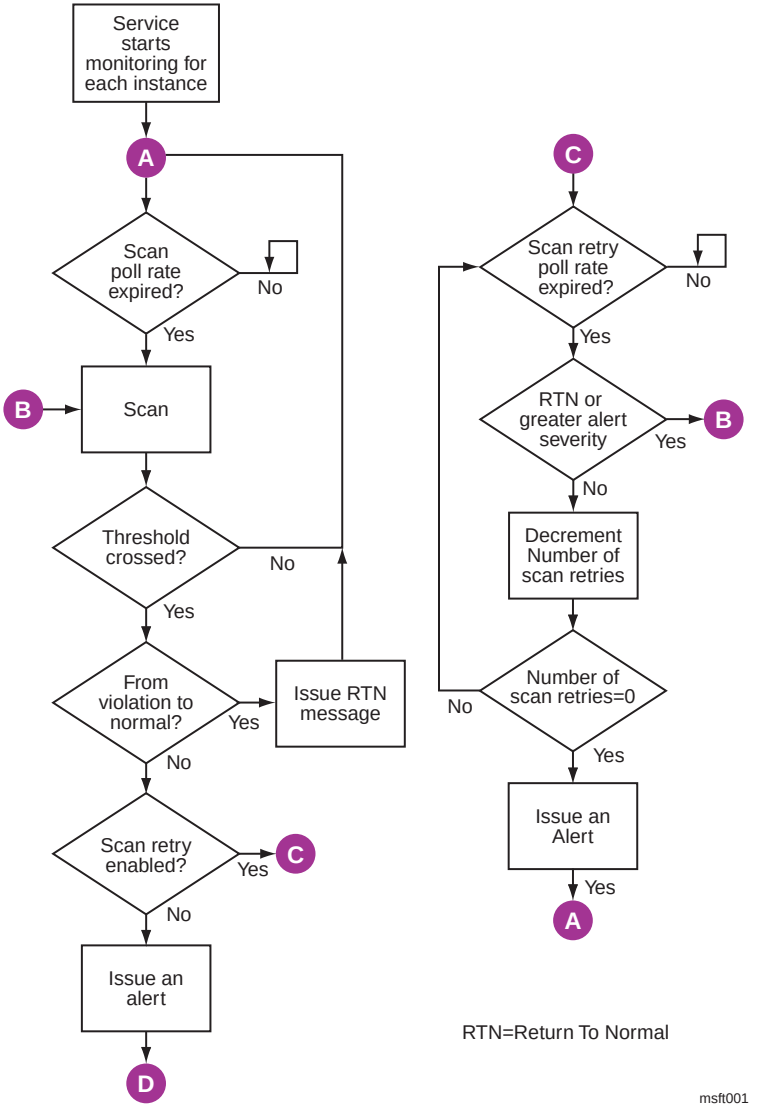
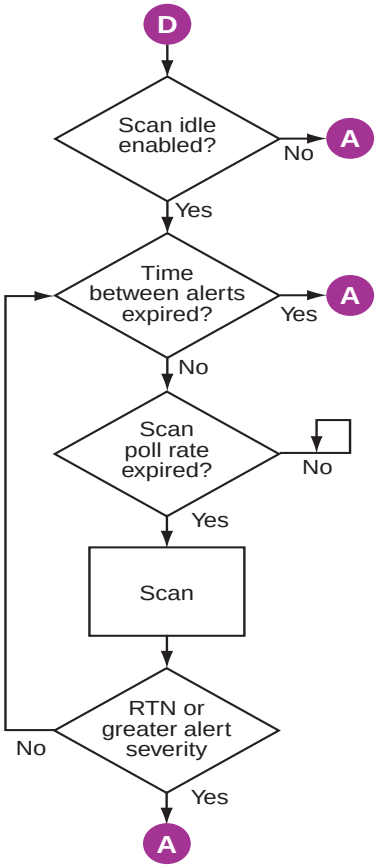


Figure 2-6. Scanning Diagram, Part 2



RTN=Return To Normal

msft002

Chapter 3
Configuring the Software Availability Manager

This chapter explains how to configure email and the instances you want the ftServer Software Availability Manager (SAM) to monitor. It presents the following topics:

- "Configuring Email"
- "Setting Up SAM to Run a Program"
- "Changing Default Values of the Instance Parameters"
- "SAM Instances"

Configuring Email

To enable SAM to send email alerts automatically, your server must be running a MAPI-compliant email client, like Microsoft Outlook®. You must configure the SAM service to use an account that has administrative privileges and permissions to the email profile.

Before you configure email, perform these steps.

1. Right-click **My Computer** and click **Manage**.
2. Double-click **Services and Applications** and then click **Services**.
3. On the right-hand panel, right-click **ftServer Software Availability Manager** and click **Properties**.
4. Click the **Log On** tab.
5. Select **This account** and enter a Windows user account name that has administrative privileges and permissions to the email client. This name should be preceded by the network domain name, for instance NETWORK_DOMAIN_NAME\MyUserName).
6. Type the password for this account in the two boxes provided.
7. Click the **General** tab and click **Stop** to stop the service.
8. Click **Start** to restart the service.

Before you can use the SAM email facility, you must configure it. Configuring SAM email involves two parts: email user setup and email alert setup.

- Email user setup establishes a user in whose name SAM sends email. You use your email program's user profile name, and its related password, for the SAM User Profile Name and Password values, respectively.
- Email alert setup establishes the content of the alert email. Components of the email alert are:
  - Alert Identifier. Either "Default" or a description you provide, like "Disk space running low" or "CPU usage approaching threshold."
  - Email Recipients. The email addresses of persons to receive the alert.
  - Subject. The default is " ftServer Software Availability Manager Alert." You may provide your own heading.
  - Alert Message Body. A message that precedes the message that SAM generates. You can use the default Alert Message Body or provide your own.
  - Return to Normal Message Body. A message that precedes the message that SAM generates. You can use the default Return to Normal Message Body or your own message.

    SAM sends the Return to Normal Message automatically when an instance's value returns from outside of the threshold value range to normal (within the range).
  - File Attachment (Optional). The path name of a file you want to send with the email.
  - Test Email. Click this button to test whether your email is properly configured.

Email User Setup

Email user setup establishes an email client profile name.

To set up user email

1. On the Express5800/320Ma desktop, click the **ftServer version Management Tools** icon.
2. Right-click the **ftServer Software Availability Manager** icon, then click **Properties**.
3. On the **Express5800/320Ma Software Availability Properties** page, click the **Email User Setup** tab.
4. In the **User Profile Name** box, type the user profile name from your email's application. (Refer to your email vendor's documentation for this information.)

5. In the **Password** and **Confirm Password** boxes, type the password associated with the email user profile name you supplied in the previous step.

   The password you type controls access to this email account. The password is encrypted in the registry for security reasons.

   If you change the password in your email application, you must also change it in the Email User Setup.

   You may leave this box blank if your email account does not require a password.

6. Click **OK**.
7. Click **Yes** to accept the changes.

Email Alert Setup

You can configure an instance to do the following when its threshold is exceeded:

- Send email alert notification. You implement alert notification by providing alert IDs and messages in the email alert setup.
- Attach a file. You can specify a file name to send as an attachment to the email notification.

Alert Email Notification

The first alert email notification you set up must be the Default alert. You can then set up other alert notifications by following the same procedure, with modifications, that you used for setting up the Default alert.

You use the following three buttons on the **Email Alert Setup** tab as described below:

- **Use Default ID**. To restore a nondefault alert ID to the default.
- **Create New ID.** To create a new alert ID.
- **Delete Selected ID**. To delete the alert ID selected from the list.

Default Email Alert Notification

To set up the default email alert notification

1. On the Express5800/320Ma desktop, click the **ftServer version Management Tools** icon.
2. Right-click the **ftServer Software Availability Manager** icon, then click **Properties**.
3. Click the **Email Alert Setup** tab. The **Email Alert Setup** tab appears, with **Default** in the **Alert Identifier** box.

4. In the **Email Recipients** box, type the email addresses of the persons to receive this alert.

   You must supply at least one name in this box. Separate multiple names with a semicolon.

5. If you want, change the wording in the **Subject** and **Alert Message Body** boxes.

   You may leave the Alert Message Body blank. (SAM does not limit the length of the strings you may enter into either box, but your email application may.)

6. If you want, change the wording in the **Return to Normal Message Body** box.
7. If you want to include a file or document with the email alert, click the browse button (with the ellipsis: ...) to the right of the **File Attachment (Optional)** box to display the Open dialog box. Then browse to the file you want to include and click **Open**.

   The attached file will be sent when there is an alert (or realert) *and* when the current value returns to normal.

8. Click **OK** on the **Email Alert Setup** tab.
9. Click **Yes** to accept the changes.

Figure 3-1. Sample Default Email Alert

```
The ftServer Software Availability Manager has detected an alertable condition within the
monitored instance detailed below.
Monitored Instance:          Disk Free Space <DeviceID: Win32_LogicalDisk.DeviceID="C:">
ComputerName:                Express5800/320Ma
Timestamp:                   9:55:26 AM  03/30/2000
Alert Condition:             Low Threshold Alarm
Configured Threshold Value:  20 (Percentage)
Current Value:               200966144 (9%)
% based on max value of:     2144043008
```

Nondefault Alert Notification

You may want to create email alert notifications for specific events rather than using only the default alert. To customize your own alert identifier, you must create one and then associate it with a selected instance, using the steps shown below.

To create a nondefault alert notification

1. On the Express5800/320Ma desktop, click the **ftServer version Management Tools** icon.

2. Right-click the **ftServer Software Availability Manager** icon, then click **Properties**.
3. On the **Software Availability Properties** page, click the **Email Alert Setup** tab.
4. Click **Create New ID**.
5. In the **Enter Email Alert ID** box, type a description of the alert ID. For example, **Running low on disk space**! might be the alert ID you would associate with the Disk Free Space instance.
6. Click **OK**.
7. In the **Alert Identifier** box, scroll to and click the new alert ID to make it appear in the box.
8. Fill in the **Email Recipients**, **Subject**, **Alert Message Body**, **Return to Normal Message Body**, and if needed, **File Attachment (Optional)** boxes with appropriate entries.
9. Click **OK** on the bottom of the **Email Alert Setup** tab.

   A question box appears, asking if you want to accept the changes to the Email Alert setting.

10. Click **Yes** to accept the changes.

Associating a Nondefault Alert ID with an Instance

You specify the alert ID to send with a particular instance by *associating* the alert ID with the instance.

To associate a nondefault Email Alert ID with a selected instance

1. On the Express5800/320Ma desktop, click the **ftServer version Management Tools** icon.
2. Right-click the **ftServer Software Availability Manager** icon, then click **Properties**.
3. On the **Express5800/320Ma Monitored Instances** tab, click the desired instance in the **Select Instance** box; for example, **Disk Free Space**.
4. Select **Enable alerts for selected instance** if it is not already selected.
5. In the **Email Alert ID** box, select the ID you want to associate with the selected instance; for example, the **Running low on disk space!** alert ID created in “Nondefault Alert Notification” on page 3-4**.**
6. Click **OK**.

   A question box appears, asking if you want to accept the changes.

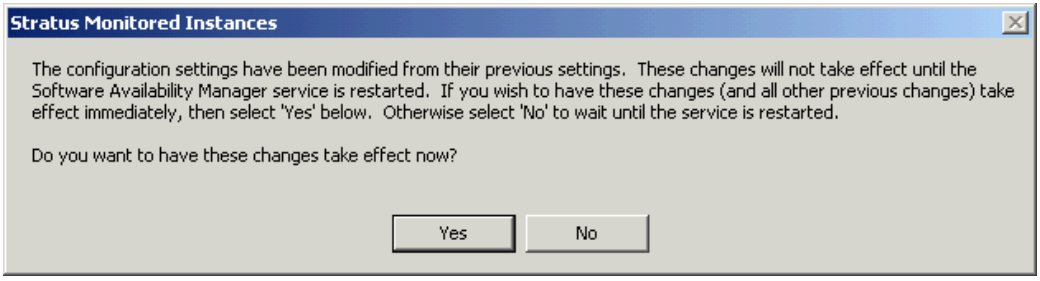
7. Click **Yes** to accept the changes.

8. If you are changing an existing association, the dialog box shown in Figure 3-2 appears. Click **Yes** or **No** according to your preference.

NOTE

The dialog box in Figure 3-2 appears whenever you click **Yes** to modify a value.

Figure 3-2. Accepting Changes to the Configuration


Stratus Monitored Instances
The configuration settings have been modified from their previous settings. These changes will not take effect until the Software Availability Manager service is restarted. If you wish to have these changes (and all other previous changes) take effect immediately, then select 'Yes' below. Otherwise select 'No' to wait until the service is restarted.
Do you want to have these changes take effect now?
Yes
No

Deleting an Alert ID

You may delete a nondefault alert ID. You cannot delete the Default alert ID.

To delete a nondefault alert ID

1. On the Express5800/320Ma desktop, click the **ftServer version Management Tools** icon.
2. Right-click the **ftServer Software Availability Manager** icon, then click **Properties**.
3. Click the **Email Alert Setup** tab.
4. In the **Alert Identifier** box, scroll to select the ID you want to delete.
5. Click **Delete Selected ID**.
6. Click **Yes** to the question box that asks you to confirm the deletion.

   If you delete an Alert ID that is currently referenced by an instance, that instance's ID is reset to the Default Alert ID.

7. Click **Yes** or **No** when the dialog box shown in Figure 3-2 appears.

Sending No Notification

You may configure an instance to send no notification.

To configure an instance to send no notification

1. On the Express5800/320Ma desktop, click the **ftServer version Management Tools** icon.
2. Right-click the **ftServer Software Availability Manager** icon, then click **Properties**.
3. On the **Express5800/320Ma Monitored Instances** tab, click the desired instance in the **Select Instance** box.
4. Ensure that there is no check mark in the check box next to **Enable alerts for selected instance**.
5. Click **OK** on the bottom of the **Email Alert Setup** tab.
6. Click **Yes** to accept the changes.

Testing Email

The **Test Email** button tests whether your email is configured properly.

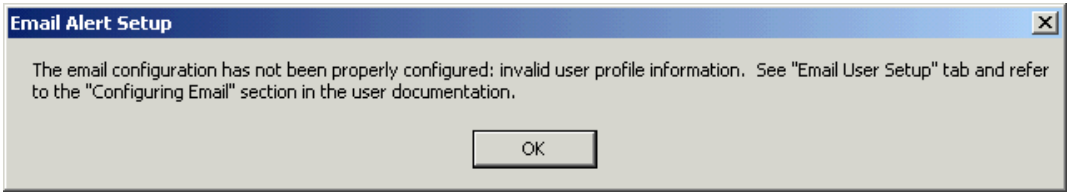
To test email

1. On the Express5800/320Ma desktop, click the **ftServer version Management Tools** icon.
2. Right-click the **ftServer Software Availability Manager** icon, then click **Properties**.
3. On the **Software Availability Properties** page, click the **Email Alert Setup** tab.
4. Click **Test Email**.

   If your email is properly configured, a message to that effect will appear.

   If your email is not properly configured, the message in Figure 3-3 appears, suggesting how to troubleshoot the problem.

Figure 3-3. Email Configuration Error


Email Alert Setup
The email configuration has not been properly configured: invalid user profile information. See "Email User Setup" tab and refer to the "Configuring Email" section in the user documentation.
OK

Setting Up SAM to Run a Program

To set up SAM to run a program

1. On the Express5800/320Ma desktop, click the **ftServer version Management Tools** icon.
2. Right-click the **ftServer Software Availability Manager** icon, then click **Properties**.
3. On the **Express5800/320Ma Monitored Instances** tab, in the **Select Instance** box, click the desired instance.
4. If the **Enable alerts for selected instance** check box is not selected, select it.
5. In the **Email Alert ID** box, click either **Default** or the name of the alert ID with which the program to be run is associated.
6. In the **Program to launch (Optional)** box, click the browse button (**...**) to display the **Open** dialog box. Then browse to the program you want to be run. The program that runs must not be interactive, as no window is displayed. Also, the program must exit by itself.
7. Select the program and click **Open**.
8. Click **OK** on the **Express5800/320Ma Monitored Instances** tab.
9. Click **Yes** to accept the change.

Changing Default Values of the Instance Parameters

SAM is installed with default values for the instance parameters. However, they may not be the most appropriate values for any given installation. It is recommended that users review the settings of all instances in consultation with key system personnel before using SAM as a monitoring tool.

To view or change the default values for instances

1. On the Express5800/320Ma desktop, click the **ftServer version Management Tools** icon.
2. Right-click the **ftServer Software Availability Manager** icon, then click **Properties**.
3. On the **Express5800/320Ma Monitored Instances** tab, view the values set for the instance selected in the **Select Instance** box.
4. To change a value, click an instance name in the **Select Instance** box.
5. Supply a new value in the appropriate box, and click **OK** or **Apply** to save the new setting.
6. Click **Yes** to accept the settings.

Chapter 4, “Sample Configuration” provides a full sample configuration.

SAM Instances

The SAM instances are described in the following sections.

Some values on the **Express5800/320Ma Monitored Instances** tab may be visible, though grayed out, for the following reasons. The Scan retry, Scan idle, and Threshold Setup settings are enabled by their associated check boxes. You must select the check box before you can supply values for these parameters. If the check box is grayed out, it means the setting is disabled by default. On the other hand, if you can check or clear the check box, the default value will appear, regardless of whether or not the check box is selected.

NOTE

If the **Enable alerts for selected instance** check box is not checked, all parameter instances for the selected instance are grayed out.

Context Switches (Per Second)

Context Switches (Per Second) is the rate of context switches from one thread to another.

In a multitasking operating system, a *context switch* is the CPU’s interruption of a running thread to run another. The thread it starts running may belong to the same process as the thread it interrupted, or to another. A context switch usually occurs when:

- A thread’s time slice has expired.
- A higher-priority thread that is ready to run preempts a lower-priority thread.
- A running thread needs to wait for data or system resources before being able to continue. A waiting thread relinquishes the remainder of its time slice.

Context switching gives a system the appearance of executing multiple threads concurrently.

A high rate of context switches indicates that threads are sharing the processor. A low rate indicates that threads are not sharing the processor very actively, perhaps because a single application is monopolizing the processor, or perhaps because very little processing is being done on the system. However, a high rate may indicate that too many processes are running simultaneously. This, combined with other instances such as CPU usage, may correlate to an overloaded system.

SAM allows for an alert condition based on a high level of context switching, which could indicate that the system is overworked at a particular point in time. Due to its dynamic and indivualistic nature, the Context Switches (Per Second) instance is off by default.

CPU Usage

CPU Usage is the percentage of time that a processor is busy executing all running processes and threads. (This instance parameter excludes the system idle thread, which runs only when no threads with higher priority are running and which is an indicator of processor idle time.) Sustained high CPU usage can degrade system performance.

A high percentage of CPU usage by a process may indicate a poorly designed application or a performance problem in the system. For instance, an application may not be releasing system resources properly, or a memory bottleneck may be increasing paging activity, thereby overtaxing the processor.

SAM generates a run-time instance of the CPU Usage instance for each CPU in the system. The threshold values supplied for this instance apply to each CPU. That is, you cannot configure different thresholds for different CPUs. In any alert it generates, SAM identifies the CPU that had the threshold violation.

The CPU Usage instance is on by default.

Disk Free Space

Disk Free Space is the ratio of free disk space to total usable disk space, for each logical disk. In the context of SAM, a logical disk is a fixed, local, nonremovable, lettered disk drive. The threshold values supplied for this instance apply to each logical disk in the system. That is, you cannot configure different thresholds for different logical disks.

If any logical disk's free space falls below the configured threshold, for instance, 10%, SAM would send email notification (assuming you had configured the instance to do so). You could then provide more disk space to remedy the problem.

SAM generates a run-time instance of the Disk Free Space instance for each logical disk on the system. The threshold values supplied for this instance apply to each logical disk. That is, you cannot configure different thresholds for different logical disks. In any alert it generates, SAM identifies the logical disk that had the threshold violation.

The Disk Free Space instance is on by default.

Event Log Messages

The Event Log instances detect when the Windows Event Log receives a System or Application error or warning message. There is a separate instance for entries logged as Warnings and entries logged as Errors. SAM can monitor the following:

- Event Log: Application Error Messages
- Event Log: Application Warning Messages
- Event Log: System Error Messages
- Event Log: System Warning Messages

Warnings and Errors report whatever the monitored source has been programmed to report as warnings or errors to the Event Log. Event Log Warnings report problem conditions. Event Log Errors report device or application failures.

This instance will not report the informational messages that monitored sources can also generate.

The Event Log instances are on by default for Errors and off by default for Warnings.

Memory Available

Memory Available is the size in megabytes of the virtual memory currently available in the system. This quantity combines the size of RAM plus the size of the system page file; that is, physical RAM plus the swap file.

Running out of virtual memory can cause system instability or even application failures. If the amount of memory regularly falls below a threshold amount, for example, 4 MB, you may want to install more memory or increase the size of the paging file.

The Memory Available instance is on by default.

Page File Usage

Page File Usage is the percentage of the page file currently in use. A *page file*, also known as virtual memory, is a file that the Windows Virtual Memory Manager (VMM) creates on disk as an extension of physical memory space. This instance's default setting generates a warning when a very high percentage of the page file is in use. When this happens, the system is starting to run low on virtual memory.

When physical memory is full and a thread needs data that is not in physical memory, VMM writes pages of its physical-memory contents to the disk and loads the needed data from the disk into the freed area of physical memory. Reading and writing memory to and from a page file is called *paging*, or *swapping*, in memory.

If your system's page file is large and only a small amount of it is being used, you may want to free the excess disk space.

This instance warns when page file usage is very high, and therefore the page file currently available may be too small.

The Page File Usage instance is on by default.

Chapter 4
Sample Configuration

A sample configuration of the ftServer Software Availability Manager instances follows.

Sample Configuration

Table 4-1 describes the parameters and controls on the **Express5800/320Ma Monitored Instances** tab. You use these to configure the ftServer Software Availability Manager instances. These are described in greater detail in “Instance Parameters” on page 2-2.

Table 4-1. SAM Parameters

Parameter	Description
Select Instance	The window in which the SAM instances appear.
Enable alerts for selected instance	Enables warnings and alarms to be generated when the monitored component highlighted in the **Select Instance** menu exceeds its thresholds.
Scan poll rate (in seconds)	The interval, in seconds, at which SAM will scan (poll) an instance to detect a possible threshold violation.
Email Alert ID	The name of the alert to be sent. This is either a user-defined alert or the Default alert.
Program to launch (optional)	The program, if any, that you want to run in the event of a threshold violation. The program must not interface with (or need a response from) the user, as no window will be displayed. Also, the program must exit by itself. This field is blank by default.
Scan Retry	A check box that enables you to use **Number of scan retries** and **Scan retry poll rate (in seconds)**.
Number of scan retries	The number of times to retry the scan at the **Scan retry poll rate (in seconds)** interval.

Table 4-1. SAM Parameters *(Continued)*

Parameter	Description
Scan retry poll rate (in seconds)	The interval, in seconds, at which SAM makes subsequent scans after detecting a first threshold violation. The subsequent scans are made to verify that the threshold violation is not transient (a spike).
Scan idle	A check box that enables you to use **Time between alerts (in seconds)**.
Time between alerts (in seconds)	The number of seconds during which an instance is not scanned after an alert has occurred. This parameter prevents multiple alerts from being issued during the specified period. The maximum value for this parameter is 72 hours (259200 seconds). A more typical value is 3600 (1 hour).

Displaying the SAM Interface

You must display the SAM interface before configuring instances.

To display the SAM interface

1. On the Express5800/320Ma desktop, click the **ftServer version Management Tools** icon.
2. Right-click the **ftServer Software Availability Manager** icon, then click **Properties**.

The SAM interface appears with the **Express5800/320Ma Monitored Instances** tab selected.

Configuring Context Switches (Per Second)

The significance of this instance is somewhat complex and relies on other, related system performance factors. Enable and configure this instance only if you fully understand its implications. See “Context Switches (Per Second)” on page 3-9 for details. This instance is disabled by default.

To configure Context Switches (Per Second)

1. On the **Express5800/320Ma Monitored Instances** tab, click **Context Switches (Per Second)** in the **Select Instance** box.
2. If **Enable alerts for selected instance** is not checked, check it.
3. In **Scan poll rate (in seconds)**, enter the number of seconds to scan the instance. The default is 300.
4. In **Email Alert ID**, select the alert to send in the event of a threshold violation. This will be either the default alert ID or one you created (e.g., **Context switches per second overload.**)
5. In **Program to launch (optional)**, click the ellipsis (...) to browse to and select the program. Click **Open** to select the program.
6. Check **Scan Retry**, if it is not already checked, and enter values for:
   - **Number of scan retries**. The default is 5.
   - **Scan retry poll rate (in seconds)**. The default is 60.
7. Check **Scan Idle**, if necessary, to enable specification of a **Time between alerts (in seconds)** value. The default is 3600.
8. The **Count** radio button is automatically selected, since context switches per second are being counted.
9. Specify values for:
   - **High Threshold Warning**. The number of context switches per second that would initiate a warning (less severe than an alarm). The default is 10,000.
   - **High Threshold Alarm**. The number of context switches per second that would initiate an alarm. The default is 15,000.

   Low Threshold Warning and Low Threshold Alarm are grayed out for this instance.
10. Put your changes into effect by following the procedure in “Making Changes Effective” on page 4-8.

Configuring CPU Usage

To configure CPU Usage

1. On the **Express5800/320Ma Monitored Instances** tab, select **CPU Usage** in the **Select Instance** box
2. If **Enable alerts for selected instance** is not checked, check it. For CPU Usage, this setting is unchecked by default.
3. In **Scan poll rate (in seconds)**, enter the number of seconds to scan the instance. The default is 300.

4. In **Email Alert ID**, select the alert to send in the event of a threshold violation. This will be either the default alert ID or one you created.
5. In **Program to launch (optional)**, click the ellipsis (...) to browse to and select the program. Click **Open** to select the program.
6. Check **Scan Retry**, if it is not already checked, and enter values for:
   - **Number of scan retries**. The default is 3.
   - **Scan retry poll rate (in seconds)**. The default is 60.
7. Check **Scan Idle**, if necessary, to enable specification of a **Time between alerts (in seconds)** value. The default is 3600.
8. The **Percent** radio button is automatically selected, since CPU usage is a percentage of time the CPU is active.
9. Specify values for:
   - **High Threshold Warning**. The percentage of CPU usage that would initiate a warning (less severe than an alarm). The default is 80 percent.
   - **High Threshold Alarm**. The percentage of CPU usage that would initiate an alarm. The default is 90 percent.

   Low Threshold Warning and Low Threshold Alarm are grayed out for this instance.
10. Put your changes into effect by following the procedure in “Making Changes Effective” on page 4-8.

Configuring Disk Free Space

To configure Disk Free Space

1. On the **Express5800/320Ma Monitored Instances** tab, select **Disk Free Space** in the **Select Instance** box
2. If **Enable alerts for selected instance** is not checked, check it.
3. In **Scan poll rate (in seconds)**, enter the number of seconds to scan the instance. The default is 300.
4. In **Email Alert ID**, select the alert to send in the event of a threshold violation. This will be either the default alert ID or one you created.
5. In **Program to launch (optional)**, click the ellipsis (...) to browse to and select the program. Click **Open** to select the program.
6. **Scan Retry** is unchecked by default for this instance because the percentage of a disk’s free space does not spike significantly within short periods of time. You can, however, check Scan Retry and specify values for the **Number of scan retries** and **Scan retry poll rate (in seconds)** if you want.

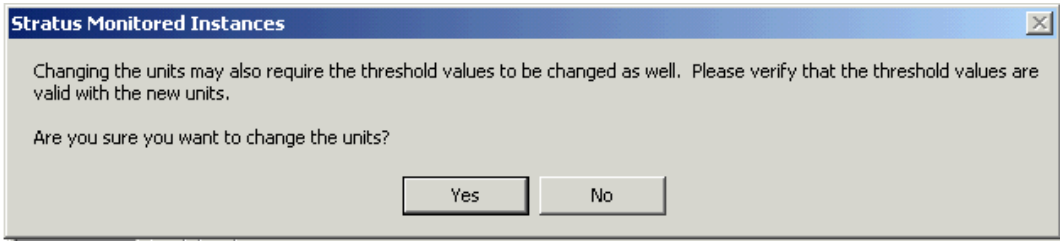
7. Check **Scan Idle**, if necessary, to enable specification of a **Time between alerts (in seconds)** value. The default is 3600.

   The **Percent** radio button is automatically selected, since disk free space is a percentage of total disk space.

   However, you can change the Units value to Megabytes if you want.

8. If you want to change the measured units from Percentage to Megabytes, check the **Megabytes** radio button and click **Yes** to the dialog box that appears, as shown in Figure 4-1.

Figure 4-1. Changing Units of Measurement


Stratus Monitored Instances
Changing the units may also require the threshold values to be changed as well. Please verify that the threshold values are valid with the new units.
Are you sure you want to change the units?
Yes
No

9. Specify values for:
   - **Low Threshold Warning**. The percentage of disk free space that would initiate a warning (less severe than an alarm). The default is 30 percent.
   - **Low Threshold Alarm**. The percentage of disk free space that would initiate an alarm. The default is 20 percent.

   High Threshold Warning and High Threshold Alarm are grayed out for this instance.

10. Put your changes into effect by following the procedure in "Making Changes Effective" on page 4-8.

Configuring Event Log Messages

To configure Event Log Messages

1. On the **Express5800/320Ma Monitored Instances** tab, select one of the event-log instances:
   - Event Log: Application Error Messages.
   - Event Log: Application Warning Messages.
   - Event Log: System Error Messages.

- Event Log: System Warning Messages.

2. If you are configuring Error Messages, the **Enable alerts for selected instance** is automatically checked.

   If you are configuring Warning Messages, check this box to enable alerts.

   The default **Scan poll rate (in seconds)** for Warning and Error messages is 10 seconds.

3. In **Email Alert ID**, select the alert to send in the event of a threshold violation. This will be either the default alert ID or one you created.

   This parameter is grayed out for Warning Messages unless you checked **Enable alerts for selected instance**.

   All other boxes on the **Express5800/320Ma Monitored Instances** tab are grayed out when configuring Event Log instances. However, the **Messages** radio button is checked, indicating that the only inputs into these instances are messages.

4. Put your changes into effect by following the procedure in "Making Changes Effective" on page 4-8.

Configuring Memory Available

To configure Memory Available

1. On the **Express5800/320Ma Monitored Instances** tab, select **Memory Available** in the **Select Instance** box
2. If **Enable alerts for selected instance** is not checked, check it.
3. In **Scan poll rate (in seconds)**, enter the number of seconds to scan the instance. The default is 30.
4. In **Email Alert ID**, select the alert to send in the event of a threshold violation. This will be either the default alert ID or one you created.
5. In **Program to launch (optional)**, click the ellipsis (...) to browse to and select the program. Click **Open** to select the program.
6. Check **Scan Retry**, if it is not already checked, and enter values for:
   - **Number of scan retries**. The default is 3.
   - **Scan retry poll rate (in seconds)**. The default 20.
7. Check **Scan Idle**, if necessary, to enable specification of a **Time between alerts (in seconds)** value. The default is 3600.
8. The **Megabytes** radio button is automatically selected, since memory available is measured in megabytes.
9. Specify values for:

- **Low Threshold Warning**. The amount of available memory that would initiate a warning (less severe than an alarm). The default is 40 megabytes.
- **Low Threshold Alarm**. The amount of available memory that would initiate an alarm. The default is 20 megabytes.

High Threshold Warning and High Threshold Alarm are grayed out for this instance.

10. Put your changes into effect by following the procedure in "Making Changes Effective" on page 4-8.

Configure Page File Usage

To configure Page File Usage

1. On the **Express5800/320Ma Monitored Instances** tab, select **Page File Usage** in the **Select Instance** box
2. If **Enable alerts for selected instance** is not checked, check it.
3. In **Scan poll rate (in seconds)**, enter the number of seconds to scan the instance. The default is 30.
4. In **Email Alert ID**, select the alert to send in the event of a threshold violation. This will be either the default alert ID or one you created.
5. In **Program to launch (optional)**, click the ellipsis (...) to browse to and select the program. Click **Open** to select the program.
6. Check **Scan Retry**, if it is not already checked, and enter values for:
   - **Number of scan retries**. The default is 3.
   - **Scan retry poll rate (in seconds)**. The default 30.
7. Check **Scan Idle**, if necessary, to enable specification of a **Time between alerts (in seconds)** value. The default is 3600.
8. The **Percent** radio button is automatically selected since page file usage is a percentage of the page file, or virtual memory, currently in use.
9. Specify values for:
   - **High Threshold Warning**. The percentage of page file usage that would initiate a warning (less severe than an alarm). The default is 80 percent.
   - **High Threshold Alarm**. The percentage of page file usage that would initiate an alarm. The default is 90 megabytes.

   Low Threshold Warning and Low Threshold Alarm are grayed out for this instance.
10. Put your changes into effect by following the procedure in "Making Changes Effective" on page 4-8.

Making Changes Effective

1. When you have supplied the desired values for an instance, click **OK**.

   A question box appears, asking you to confirm the modification.

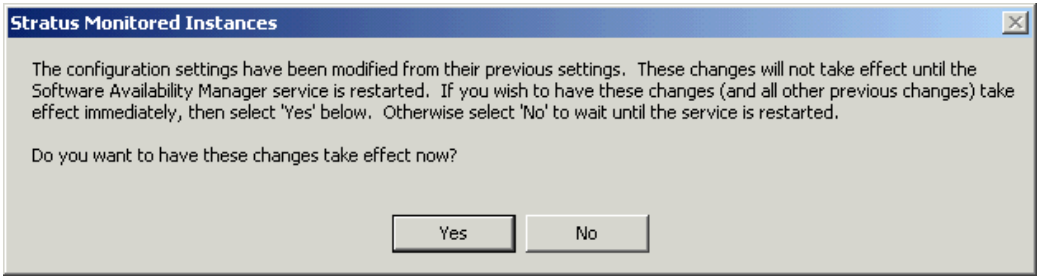
2. Click **Yes** to accept. If you click **No**, your changes are ignored and the SAM interface closes.

   The same question box appears when you change an instance's parameters and then change either to another instance or to another tab. In these cases, the interface does not disappear if you click **No**.

   If you accepted the changes, the dialog box shown in Figure 4-2 appears.

3. Click **Yes** or **No** according to your preference.

Figure 4-2. Accepting Changes to the Configuration


Stratus Monitored Instances
The configuration settings have been modified from their previous settings. These changes will not take effect until the Software Availability Manager service is restarted. If you wish to have these changes (and all other previous changes) take effect immediately, then select 'Yes' below. Otherwise select 'No' to wait until the service is restarted.
Do you want to have these changes take effect now?
Yes
No

Glossary

alert

A warning or alarm sent by email.

bottleneck

The device with the smallest maximum throughput for a given unit of work. It is the point in the system that slows down an otherwise higher rate of work. Bottlenecks can occur because resources are not being used efficiently or a resource is too slow or too small.

context switch

A multitasking process in which the CPU interrupts the processing of a thread and starts processing another thread.

event

A state change in a monitored instance. Examples of events are available disk space falling below specified limits, and returning to a normal level of free space (Return to Normal).

hard page fault

Retrieval from the hard disk (that is, from virtual memory) of data not found in physical memory. Also known as “memory hard page fault.”

idle

The state of a thread or virtual machine that is runnable but needs input before continuing. See also **idle thread**.

idle thread

A thread that runs when there are no executable threads. There is one idle thread per processor. See also **idle time**.

idle time

The time the processor spends in the idle thread. When a clock interrupt occurs, a clock tick is attributed to the active thread. When the active thread is the idle thread, the time is counted as idle time. The amount of idle time is a system-performance measure. See also **idle thread**.

instances

The system performance elements that SAM monitors; for instance, CPU usage, free disk space, and so on.

logical disk

In the context of SAM, a logical disk is a fixed, local, nonremovable, lettered disk drive.

page

A unit of memory that the operating system can move from physical memory to disk, and vice versa, in order to free up space in physical memory or retrieve data or code from disk.

page file

A file that the Windows Virtual Memory Manager (VMM) creates on disk as an extension of its physical memory space.

paging

The process of moving data between physical memory and disk, or vice versa. Also known as *swapping*.

thread

A part of a process—that is, specific program commands within a process—that is currently running in the processor. All threads of a process share the virtual address space, global variables, and operating system resources of the process.

threshold violation

The change of a monitored instance's value from within to outside of its configured limits.

virtual memory

Memory that exists on disk as well as in physical memory (RAM). A virtual-memory system, like Windows, extends its memory capacity by using disk space for memory when it runs out of physical memory.

Virtual Memory Manager

A Windows component that implements and controls virtual memory and paging.

Index

A

alert ID
- creating nondefault, 3-4
- default, 3-3
- setting for no notification, 3-7

Alert Identifier box, 3-2
Alert Message Body box, 3-2, 3-4
attached files, 3-4

B

boxes, SAM
- Alert Identifier, 3-2
- Alert Message Body, 3-2
- Email Recipient, 3-2
- File Attachment (Optional), 3-2
- Return to Normal Message Body, 3-2
- Subject, 3-2

buttons, SAM
- Create New ID, 3-3
- Delete Selected ID, 3-3
- Reset All, 2-1
- Test Email, 3-7
- Use Default, 2-1
- Use Default ID, 3-3

C

changed configuration settings, accepting, 3-6, 4-8
configuration settings, accepting changed, 3-6, 4-8
Context Switches (Per Second), 3-9
CPU Usage, 3-10
Create New ID button, 3-3

D

default alert setup, 3-3
default values, SAM, 3-8
Delete Selected ID button, 3-3
Disk Free Space, 3-10

E

email
- Alert Message Body and Subject boxes, 3-4
- configuring, 3-2
- default alert setup, 3-3
- File Attachment (Optional) box, 3-4
- sending attached files, 3-4
- setting up a user, 3-2
- Subject box, 3-4
- Test Email button, 3-7
- to run a program, 3-8
- user setup, 3-2

Email Alert ID, 2-3
Email Alert ID, associating a nondefault, 3-5
Email Alert Setup, components, 3-2
Email Recipients box, 3-2
Enable alerts for selected instance, 2-2
Event Log Messages, 3-11
events, SAM, 1-2

F

File Attachment (Optional) box, 3-2, 3-4
ftServer Management Console (ftSMC), SAM, 1-1

G

grayed-out parameters, SAM, 3-9

H

High Threshold Alarm, SAM, 2-5
High Threshold Warning, SAM, 2-5

I

idle thread, 3-10

instance descriptions
Context Switches (Per Second), 3-9
CPU Usage, 3-10
Disk Free Space, 3-10
Event Log Messages, 3-11
Memory Available, 3-11
Page File Usage, 3-11
instance parameters
Number of scan retries, 2-4, 2-7
Scan poll rate, 2-2
Scan retry poll rate, 2-4
Time between alerts, 2-4
instance settings
Email Alert ID, 2-3
Enable alerts for selected instance, 2-2
Program to launch, 2-3
Scan idle, 2-4
Scan retry, 2-4
instances, 1-2, 2-2, 3-8
default values, 3-8
how SAM scans, 2-7

L

Low Threshold Alarm, SAM, 2-5
Low Threshold Warning, SAM, 2-5

M

Memory Available, 3-11

N

no notification, setting an instance for, 3-7
nondefault alert ID, creating, 3-4
Nondefault Email Alert ID, associating with an instance, 3-5
Number of scan retries, 2-4, 2-7

P

Page File Usage, 3-11
page file, SAM, 3-11
paging, SAM, 3-11
parameters, SAM
default values, 3-8
grayed out, 3-9
Password boxes, 3-3
password, email, 3-3
polling. *See* scanning
Program to launch, 2-3
program, running by email (SAM), 3-8

R

Reset All button, 2-1
Return to Normal Message Body box, 3-2
return-to-normal message, 2-7

S

SAM. *See* Software Availability Manager
Scan idle, 2-4
Scan poll rate, 2-2
Scan retry, 2-4
Scan retry poll rate, 2-4
scanning, SAM, 2-7
sending files by email, 3-4
Subject box, 3-2, 3-4
swapping, SAM, 3-11
system idle thread, 3-10

T

Test Email button, 3-7
threshold units, 2-6
threshold violation, 2-2
Time between alerts, 2-4

U

Units box, 2-6
Use Default button of SAM, 2-1
Use Default ID button of SAM, 3-3
User Profile Name box, 3-2

V

virtual memory, 3-11
VMM. *See* Windows Virtual Memory Manager

W

Windows Virtual Memory Manager (VMM), 3-11